

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 13912 (1993): Closure of diversion channel and open cut or conduit in the body of dam - Code of practice [WRD 22: River Training and Diversion Works]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



भारतीय मानक

बांध के ढांचे में पथान्तर चैनल और खुला कटाव अथवा
नलिका बन्द करना — रीति संहिता

Indian Standard

CLOSURE OF DIVERSION CHANNEL AND
OPEN CUT OR CONDUIT IN THE
BODY OF THE DAM — CODE OF PRACTICE

UDC 627.47 : 627.845 : 006.76

© BIS 1993

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Diversion Works Sectional Committee had been approved by the River Valley Division Council.

Diversion channel and open cut or conduit in the body of the dam needs to be closed by lowering the gates at the entry end (if not utilized for other purposes). This operation is started when the dam is completed up to crest, with energy dissipation arrangements and alternative passage to discharge the water from reservoir behind the dam is available. After the closure of the channel/ conduit by gate, the conduit in the body of the dam has to be filled in with concrete of appropriate strength to make it part of the dam body. This standard is intended to give guidelines to be followed for execution of this work.

Indian Standard

CLOSURE OF DIVERSION CHANNEL AND OPEN CUT OR CONDUIT IN THE BODY OF THE DAM — CODE OF PRACTICE

1 SCOPE

This standard covers the method of closure of diversion channel and open cut or conduit in the body of dam.

2 REFERENCES

The Indian Standard IS 9349 : 1986 'Recommendations for structural design of medium and high head slide gates (*first revision*)' is a necessary adjunct to this standard.

3 METHOD FOR CLOSURE

3.1 During construction of open diversion channel or conduit in the body of the dam it is necessary to construct a gate structure for closure of the channel/conduit with the hoisting equipment level higher than probable maximum reservoir level during the non-monsoon period allowing for the rise in water level at the time of closure.

3.1.1 For dams higher than 50 metres, inspection of gate, the conduit opening and its seals should be done by a team of divers so that corrective measures are implemented before actual closure operations starts. Under water photography may also be equally helpful in detection of faults, etc.

3.2 The conduit opening in the gate structure should have seals provided all round the opening to ensure minimum leakage of water during sealing. The drawings and record of the work executed should be maintained for proper design of gate.

3.3 Closure of the diversion works should be synchronised with provision of alternative passage to the river flow either through permanent sluices or from spillway to cater to the downstream needs for conservation uses or for maintaining ecology, so that downstream supplies may continue with least disruption.

3.4 Gates and hoists used for closure of channel or conduit should be designed to cater to the dynamic water forces and bouyancy caused during closure according to IS 9349 : 1986. Proper provision of air vent should be made to cater to the air demand during closure operation.

3.5 Leakage of water through the seals of gate should be arrested by a barrier as shown in Fig. 1 and led through a steel pipe outside the body of

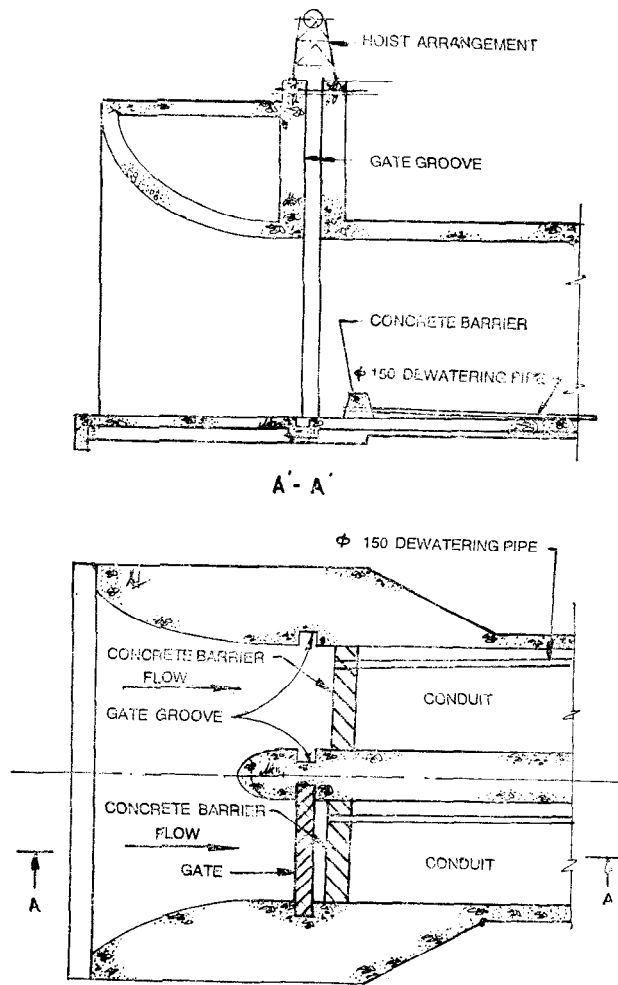
the dam. The height of the barrier and the diameter or pipe should be decided after inspecting the conduits for seepage after lowering of gate. The diameter of the pipe should not be less than 150 mm.

3.6 Before undertaking closure of the gate, the condition of the sills, girders, guide grooves and hoisting mechanism, etc, should be examined. After having done this, depending upon the damage, the methodology to be followed should be decided. In addition to the lowering of the gate, remedial measures such as placing an invert filter and replacing the damaged concrete, etc, may be required before lowering of the gate. After closure by lowering of gates, the conduit should be thoroughly inspected to check damage to concrete and reinforcement on faces both on invert and sides of conduit. The damaged surfaces should be thoroughly cleaned and prepared to receive fresh grouting concrete.

3.7 The portion of the channel/conduit falling in the body of the dam should then be plugged by minimum M 15 grade concrete placed by use of concrete pump or placer (*see* Fig. 2 for guidance) or by conventional method in case the conduit size is large. The length of concrete plug should be minimum 3 times the diameter of the conduit. Closed end of the plug inside the barrel should be provided with stopper for proper placement of concrete by pump.

3.8 After having observed the provisions given in 3.6, it would be necessary to channelise the leakage water coming through seals of the gate by placing a concrete barrier and channelising the water through a pipe as mentioned in 3.5 to see that the area where concrete plug is required to be done is in reasonably dry condition to ensure good quality concrete. After the plug concrete has attained adequate strength and undergone necessary shrinkage, the process of contact grouting as shown in Fig. 2 would be undertaken. After completing contact grouting, the pipe which carries the leakage water out, should be closed and grouted at a pressure 25 percent higher than that of leakage water to see that the pipe is fully grouted and water is prevented from flowing through the pipe.

3.9 Grout pipes and grout buttons should be provided at the rate of 3 m c/c in either direction to grout the shrinkage gap between the old conduit concrete and new plug concrete.



PLAN OF DIVERSION CONDUIT (INTAKE)

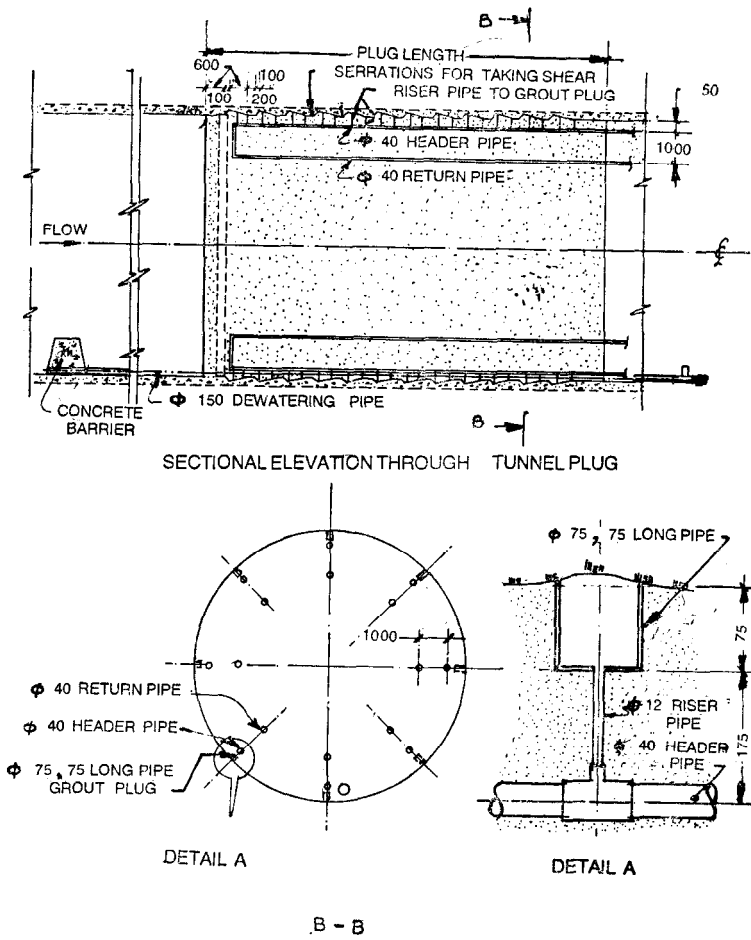
FIG. 1 ARRANGEMENT FOR DISCHARGE OF SEEPAGE WATER THROUGH PIPE STARTING FROM BARRIER

3.10 Grouting of the shrinkage gap in the conduit sides and roof should be done at a pressure 25 percent more than the upstream water head only after 180 days of plug concrete.

3.11 The steel pipe provided for draining seepage water should be grouted after grouting specified in 3.9 is done. The pressure used should be 25 percent more than upstream water head.

3.12 After inspecting the downstream conduit joint in the body of dam, gate lifting mechanism should be removed and salvaged.

3.13 Details of construction difficulties experienced during the construction and grouting works of diversion channel should be neatly mentioned in a proper form for future guidance.



(SHOWING CONTACT GROUTING)

FIG. 2 DETAILS OF PLUG AND GROUTING

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. RVD 7 (40)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephone

{ 331 01 31
331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

{ 37 84 99, 37 85 61
37 86 26, 37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036

{ 53 38 43, 53 16 40
53 23 84

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

{ 235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093

{ 632 92 95, 632 78 58
632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.
LUCKNOW. PATNA. THIRUVANANTHAPURAM.